

STEATODA FULVA (THERIDIIDAE), A SPIDER THAT FEEDS ON HARVESTER ANTS*

BY BERT HÖLLDOBLER

Harvard University, Biological Laboratories
Cambridge, Massachusetts 02138

In his revision of the spider genera *Crustulina* and *Steatoda* H. W. Levi says of the *Steatoda fulva*-group [*Steatoda fulva* (Keyserling); *S. medialis* (Banks); *S. pulcher* (Keyserling)]: "Virtually nothing is known of the natural history of these three species" (1957, p. 387). The present paper places on record some preliminary observations on the feeding behavior of *Steatoda fulva*, which were made during the course of field experiments with ants in April 1970 near the campus of the University of South Florida, Tampa.

The study area, a field of 135 m², contained 54 nests of the harvester ant *Pogonomyrmex badius* (Latreille). The nests were uniformly distributed throughout the area. They are excavated in the soil; the nest opening is located in the center of a flat sand crater (Fig. 1). On 10 occasions webs of *Steatoda fulva* were found in front of the nest entrance. Observations throughout the day showed that the webs were probably built and occupied only during the afternoon. The webs were attached to dry grass stems around the nest entrances and contained from 2-6 trapped ant workers when found (Fig. 2). The fact that *Steatoda fulva* is able to build its web so close to the nest entrance is surprising because the ants are constantly running in and out of the nest and react aggressively to any foreign animal. However this is understandable when one compares the activity of the ants on a hot day with the timing of the spider's predatory behavior. During April the *Pogonomyrmex* began to open the nests about 8 AM. Movement to and from the nest soon increased, reaching its maximum between 11:00-12:00 AM, then decreased and by 14:00 had ceased almost completely. Generally nests became active again about 15:00, reaching a second maximum about 17:00. The ants returned to their nests before sunset and outside activity had ceased by 19:00 (Fig. 3). Apparently it is during the early afternoon, when temperatures are high and the ants are inactive, that *Steatoda fulva* is able to approach the nest entrance. Ant nests that are blocked by a spider's web show no

*Manuscript received by the editor, August 3, 1970.

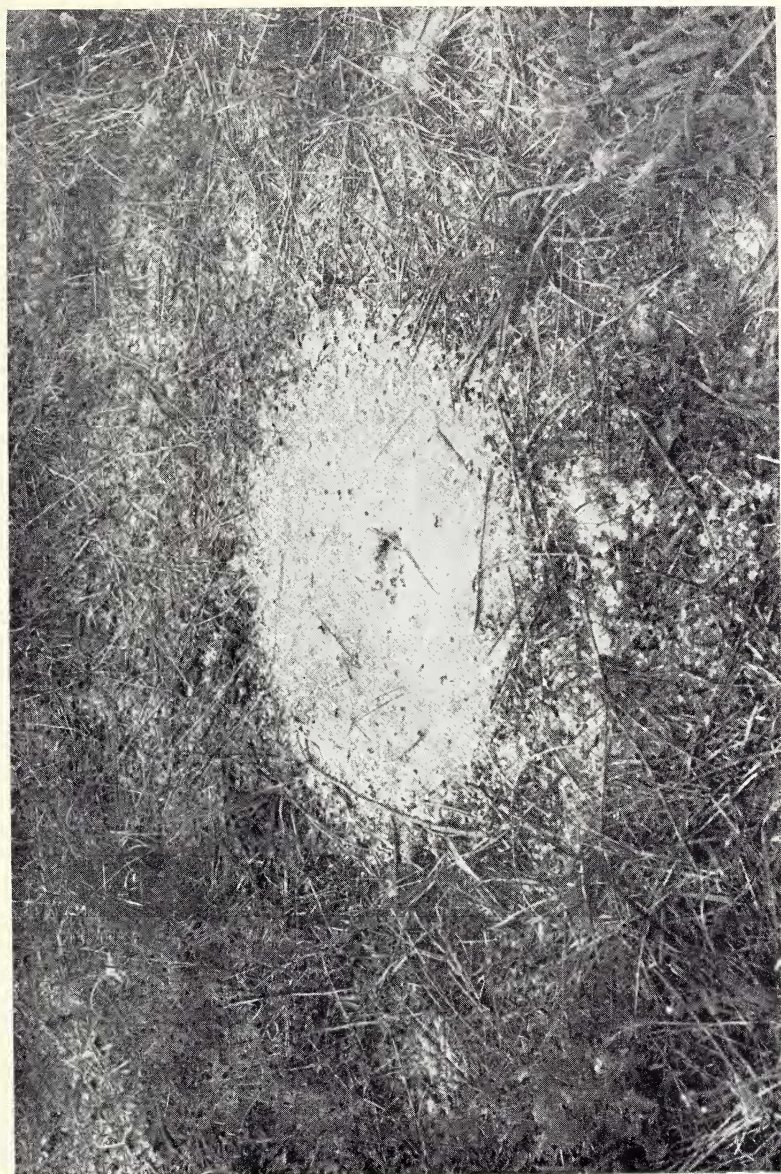


Fig. 1. Nest crater of a *Pogonomymex badius* nest.



Fig. 2. Web of *Staatoda fulva* in front of the entrance of the *Pogonomymex* nest. Five captured ants and the spider are in the web.

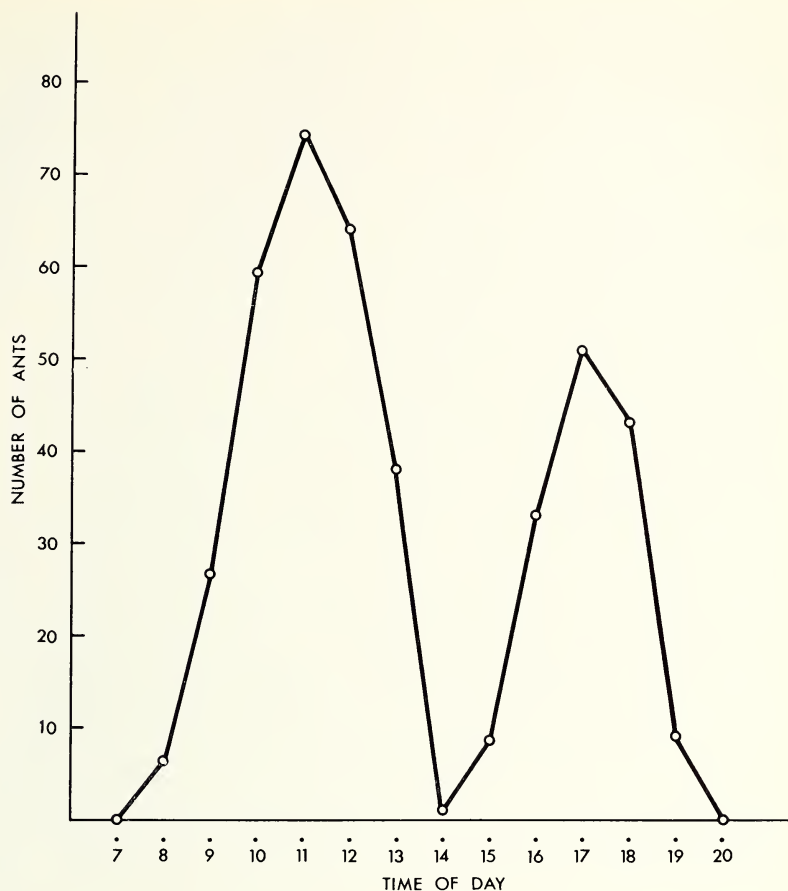


Fig. 3. Activity of *Pogonomyrmex badius* at the nest entrance on April 11, 1970, near Tampa, Florida. Abscissa: average number of ants passing through nest entrance during 5 one minute observation periods. Ordinate: time of day.

late afternoon activity. On one occasion a nest was observed soon after the web was erected. The first few ants to come out of the nest were captured in the silk. They struggled and probably discharged the mandibular gland alarm secretion (Wilson, 1958) as they elicited help from nestmates. However even giant soldiers were unsuccessful in their attempts to remove the cobweb and

finally shrank back from the sticky silk. After about 30 minutes the ants began to close the entrance from within. No more ants emerged. Up to this point the spider remained in one corner of its web. As soon as the ants withdrew into the nest, the spider wrapped its captives with more silk and then began to suck them out, one after another (Fig. 4).

The entrance of the ants' nest remained closed. After three days a new entrance was found about 1 m from the previous one. It would seem therefore that the spider can prey only once at a given entrance. Further observations on other harvester ant hunting *Steatoda fulva* were essentially the same.

As mentioned before, we found *Steatoda fulva* with *Pogonomyrmex badius* on 10 occasions. Once a *S. fulva* was seen at the entrance of the fungus growing ant *Trachymyrmex septentrionalis* (McCook). However this exception seemed to be an accident as this very small *Trachymyrmex* nest opened within a *Pogonomyrmex* nest crater and the entrances were only 15 cm apart. Thus it might be that the spider, attracted by the *Pogonomyrmex* nest area, chose the wrong entrance.

Clearly, it would be most interesting to investigate the signals by which the spider locates its prey and the nest entrance. Pilot experiments in an olfactometer arena have shown that hungry spiders orient towards a slight air current which carries the odor of *Pogonomyrmex* workers rather than an odorless air current. It is not yet known whether the spider reacts to only specific ant odors, but it is remarkable that the distribution of *Steatoda fulva* (Levi, 1957) coincides very well with the range of the genus *Pogonomyrmex* (Cole, 1968).

The related *Steatoda albomaculata* (De Geer) [= *Lithypantes albomaculatus*] also often feeds on ants (Lévi, 1957).

ACKNOWLEDGEMENTS

I thank Dr. and Mrs. H. W. Levi, Dr. E. O. Wilson and Mr. D. S. Woodruff for critically reading the manuscript. I am grateful to Dr. Levi for the determination of the spiders, to Dr. A. J. Meyerriecks for his hospitality at the University of South Florida, to my wife, Turid, for her collaboration in the field work, and to Miss Kathy Horton for her help in preparation of the manuscript. This work was supported by a grant from the Max Kade Foundation and the U. S. National Science Foundation (Grant No. GB-7734, E. O. Wilson, Sponsor).



Fig. 4. *Steatoda fulva* eating captured *Pogonomymex badius*.

REFERENCES

COLE, A. C., JR.

1968. *Pogonomyrmex* Harvester Ants. A study of the Genus in North America. Univ. Tennessee Press.

LEVI, H. W.

1957. The Spider Genera *Crustulina* and *Steatoda* in North America, Central America, and the West Indies (Araneae, Theridiidae). Bull. Mus. Comp. Zool. 117(3): 367-424.

WILSON, E. O.

1958. A chemical releaser of alarm and digging behavior in the ant *Pogonomyrmex badius* (Latreille). Psyche 65(2-3): 41-51.
-

ERRATUM. — In my paper on "A New Flightless *Dolichoctis* (Coleoptera: Carabidae) from Sumbawa," in *Psyche*, Vol. 76, No. 4, pages 387-389, the name *terrestris* in the next to the last line on page 388 is a *lapsus calami*. This name should be struck out and the name *pedestris* substituted. — P. J. Darlington, Jr., Museum of Comparative Zoology.